EAST AFRICAN COMMUNITY

EAST AFRICAN FRESHWATER FISHERIES RESEARCH ORGANIZATION

ANNUAL REPORT 1969

Six Shillings — 1970

E.A.F.F.R.O.
P. O. Box 343,
JINJA, UGANDA.

CONTENTS

APPENDICES

EAST AFRICAN FRESHWATER FISHERIES RESEARCH ORGANISATION

ANNUAL REPORT 1969

STAFF

Director :

J. Okedi, Ph.D.

Research Officers :

G. E. B. Kitaka, M.Sc.
M. J. Mann, B.Sc.
R. M. Chilvers, B.Sc.
J. M. Gee, Ph.D.
Vacant (1)

Research Officers (Trainees) :

P. Basasibwaki, B.Sc.
G. W. Ssentongo, B.Sc.

Experimental Fisheries Officer :

B. Emeru

Senior Executive Officer :

W. O. Asinuli

Accounts Officers :

A. Coutinho
K. Pandya
E. Mwangi

Personal Secretaries :

Miss Z. Khamis
Mrs. F. Kati
Miss J. Najjemba

Supplies Officer :

I. A. Mayawa

Librarian : ...

Mrs. L. Watts

Marine Engineer :
L. H. Walusimbi

Laboratory Technician :

J. Mwanja, A.M.I.S.T.

Foreman Artisan (Fisheries) :

P. D. Mesvania

Artisan (Fisheries) :

S. Ongeso

Senior Coxswain :

W. Odongo

Coxswain :

E. Odwori
A. Mukholo

UNITED NATIONS DEVELOPMENT PROGRAMME
(SPECIAL FUND) PROJECT

(F.A.O. Expert)	(E.A.F.F.R.O. Counterpart)
Project Manager : P. B. N. Jackson, M.Sc.	**Co-Manager :** J. Okedi, Ph.D.
Limnologist :	G. E. B. Kitaka, M.Sc.
Biologist (Stock Assessment) : A. J. Cordone, M.Sc.	W. Kudhongania, M.Sc.
Economist (Costs) : P. S. Whiting	C. Nsherenguzi, M.A.
Economist (Marketing) : E. Nyholm	V. Babikanyisa, B.A. (Econ.).
Masterfisherman : Captain G. Illugason	B. Emeru
Associated Biologist : Miss Eva Bergstrand, B.Sc.	
Administrative Assistant : P. Rodrigues	

STAFF AND RECRUITMENT

Considerable success in Africanisation and recruitment of local staff was achieved during the year. Mr. Nsherenguzi, a Tanzanian holder of an M.A. degree from East Germany, was recruited in February as the second Counterpart Economist. He was, therefore, attached to work with Mr. P. Whiting, the F.A.O. Economist. The only other vacant post on the Counterpart side was filled when Mr. Kudhongania was recruited in October. Mr. Kudhongania obtained an M.Sc. degree in Zoology from Davis College, California. By coincidence, the F.A.O. Fishery Biologist (stock assessment), with whom Mr. Kudhongania collaborates, is from California and the two similarly arrived to take up their duties in the last quarter. It is noted therefore that all the Counterparts to the UNDP/FAO Project have been recruited and the holders of these posts are without exception well qualified and with suitable experience. Further, Mr. Kitaka, Counterpart Limnologist, successfully understudied the F.A.O. expert, Mr. McCarraher, and took over fully from him when the latter returned to his country.

Through the kind co-operation of the Government of Canada, EAFFRO's two trainee biologists, viz. Messrs. Ssentongo and Basasibwaki proceeded to the University of British Columbia in September for a two year fisheries training leading to Masters degree. Mr. Mwanja, Laboratory Technician, however resigned his post to take up a new assignment with University College, Nairobi, in July. Mrs. Watts arrived on the 3rd September and has since taken over the responsibility of maintaining EAFFRO's library, previously maintained by Messrs. Mann and Chilvers. A Pool Stenographer, Miss Najjemba was recruited in September to handle secretarial duties largely in connection with the UNDP counterparts.

There were considerable and frequent changes in connection with Accounts staff of EAFFRO. Mr. Jumah was withdrawn in March and his replacement, Mr. Coutinho, resigned the next month in April. Mr. Pandya who took over as Accounts Officer was taken ill during September. It is with very much regret, however, that I report his death which occurred on the 16th of October. Another Accounts Officer, namely Mr. Mwangi arrived on the 11th of November to take over accounting duties.

VEHICLES AND LAUNCHES

The maintenance and repair work has been intensive all the year round. The Land Rover, UOA 852 developed serious engine trouble and its engine was overhauled: new piston rings and spark plugs were fitted, crank sraft and valves were regrinded, whilst the bearings and clutch plate were replaced. The Bedford truck, UED 90 also behaved in the same way and many worn-out parts were replaced. The Land Rover USO 264, however, continued to render good service and its maintenance was normal except the rear wheel drive shaft which broke and was replaced in October. The Toyota Crown Estate UN 39 and the Land Rover UN 40 have both given satisfactory service but involved high maintenance costs. The Volkswagen UZT 60 suffered a serious accident in June, while travelling between Kampala and Mubende. The vehicle was towed to Jinja where it received intensive repair and panel beating by EAFFRO's own maintenance staff. This vehicle was satisfactorily put back on the road in August. The Volkswagen TDT 774

stationed in Mwanza was reported to be rendering fair service. The following table given miles/kilometers run by each vehicle during the year.

		Miles/Km run 1969	Total Miles/Km
EAFFRO Vehicles :			
Land Rover	UOA 852	3,230 miles	92,464 miles
Bedford	UED 90	4,375 „	47,563 „
Land Rover	USO 264	11,860 „	45,390 „
Land Rover	UQT 282	150 Km	150 Km
Land Rover	UQT 283	3,045 „	3,045 „
UNDP Vehicles :			
Toyota Crown	UN 39	21,219 „	68,055 „
Land Rover	UN 40	15,768 „	32,723 miles
Volks Wagen	UZT 60	12,544 „	26,429 „
Volks Wagen (stationed in Mwanza)	TDT 774	—	—

Due to old age, increased high costs in maintenance and the scarcity of spares of the old Land Rover UOA 852 and Bedford pick-up UED 90, both vheicles were written off by the Board of Survey in July. However, the Bedford pick-up UED 90 was retained due to lack of a suitable vehicle of a larger capacity for transport. Two new Land Rovers, a pick-up UQT 282 and a Station Wagen UQT 283 were purchased and deliveries were made in November and December

The motor vessel "IBIS" has been in continuous use in trawling operations around Lake Victoria. Minor repairs have been carried out, including replacement of a water pump for the 12 Kilowatts generator, the service water pump, the clutch clips for the Marco winch and routine replacement of oil and fuel filters.

Launch No. 1 has also given continuous service on limnological programmes and it has been used intensively in collecting scientific data around Jinja. Repairs carried out on this boat were on its windscreen motor, port engine fuel pump and starboard engine water pump.

Launch No. 2 has been lying idle since February 1968 whilst its engine was overhauled and necessary spares were ordered from the U.K. On arrival of these spares the engine was reassembled and two new batteries fitted. A new dynamo was also fitted and the boat was seen back on the lake in November. The dinghies and the outboard engines have undergone minor repairs where necessary and are in continuous use.

LIBRARY

From September 1969, the presence of a full-time librarian made possible the planning of more extensive projects with regard to the library. A large backlog of reprints and books was catalogued, in addition to material arriving currently. A detailed survey was made of the book collection and many volumes were reclassified. Among these were a number of reference works which have been shelved together to form a separate reference collec-

tion. Labelling of all volumes was also begun. The urgent problem of space was relieved by the building of additional shelving to house the overflow of the book collection.

A special collection of FAO monographs and monographic series was begun. Items were pulled from the reprint collection and shelved separately with their own, more extensive catalogue. There are a number of important publications among this material, and it is hoped that the new arrangements will provide easier acess to them. The periodical collection was surveyed and a list made of all binding to be done. Space has become a problem in the reprint and periodical collection also, and it is anticipated that extensive reorganization will have to be done to take care of newly arrived material. However, there is a general lack of sufficient library space. A bigger collection of works is being made available through the Lake Victoria Fisheries Research Project but the lack of library accommodation is causing serious concern. The present small library is currently being used as Conference Room as well.

MEETINGS

The annual FAO African Lake Projects Managers and Co-Managers meeting was held in Jinja during the 2nd and 3rd week of January and most of the EAFFRO scientists attended certain sessions or relevant discussions. During the year the Director attended the following meetings : East African Natural Resources Research Council on 23-24 January, Committee of Ministers meeting on 7th October, Research and Social Council meeting in Arusha on 17th March and the Finance Council meeting on 14th April also in Arusha. The Working Party on Research Priorities and Administration held a meeting at EAFFRO on the 19th of June and most of the EAFFRO's scientists as well as personnel of the UNDP attended. The Director also attended the Fisheries Technical Committee meeting in Lusaka during the 2nd week of August. EAFFRO was represented at the East African Academy Annual Symposium by Mr. Babikanyisa on the 18th-19th September held at Makerere University College. Through the kind co-operation of the Government of Israel the Director toured certain aspects of the Israel fishing industry and development projects in October During the second week of December the Director and the Project Manager attended the meeting of African Lake Projects at the Volta Lake in Ghana.

SCIENTIFIC WORK OF THE ORGANIZATION

During the year under report, work was centred on the applied aspects covering projects agreed upon during the Research Co-ordinating Committee meeting. The joint efforts of EAFFRO and UNDP/FAO personnel continued most cordially and equipment and facilities were efficiently employed. Most of the work was carried out in Lake Victoria making full use of the research vessel "IBIS". Research findings are summarised below.

(1) HAPLOCHROMIS AND TRAWLING SURVEYS

Initially, analysis of trawling data for *Haplochromis* and other species collected in 1968 was conducted. Points of interest here were mainly effects of various trawls, trawling speeds and localities on the types and quantities of fish caught. The results can be summarised as follows :

(i) On hard bottoms, trawling speeds of over 2.8 knots do not increase catch rates but on soft bottoms, trawling speeds and catches increase proportionately.

(ii) Coded mesh sizes have profound effect on *Haplochromis* catches which drop drastically in mesh sizes of over 2". The catches of other fishes are not affected by mesh sizes of 2" and over but fall significantly in mesh sizes of under 2".

(iii) From a cannery point of view, although a codend of 2½" gives the best results for *Haplochromis*, a 2" codend will produce larger quantities because of the larger sizes of the catch.

(iv) Sandy and muddy areas between 45 and 75 feet deep appear to produce the highest quantities of *Haplochromis* but catches of other commercial species are proportional to depth except *Syndontis* which is inversely proportional to depth.

Bukakata is known from previous trawling experiments to be productive in *Haplochromis*. A study of the catching ability of a new "Two-canoe trawl" was made in this area and an analysis of the *Haplochromis* catches were of particular interest to a possible commercial fishery for that genus.

Haplochromis work was extended to the southern parts of Lake Victoria where the "IBIS" was doing her cruiser. However, analysis of species composition, length frequency, weight and sex of a number of samples taken from Mwanza Gulf, Emin Pasha Gulf, Speke and Nyanza Gulf was made. Generally it is observed that :

(i) A number of species are highly localized in distribution. For example a high proportion of the catches from Bukakata was formed by one predatory species *(H. michaeli)* and a mollusc crusher *(H. ishmaeli)* which only turn up occasionally in catches from other areas. Similarly the samples from the Nyanza Gulf were 98 per cent *H. obtusidens*, and other species only found occasionally elsewhere.

(ii) A number of species are very widely distributed throughout the lake. The predatory *H. victorianus* and the generalised bottom feeder *H. empodisma* are two such examples which have been found in reasonable numbers in nearly all samples collected from a wide range of localities in depth.

(2) BAGRUS STUDIES

Bagrus, popularly known as 'Semutundu' is a very important commercial species in the lake which feeds mainly on other fish. Projects for the commercial utilisation of the abundant *Haplochromis* species flock are presently under way, but it is realised that the removal of this important prey species is likely to influence the stocks of *Bagrus*. A detailed understanding of the food requirements of *Bagrus* was desirable.

The diet of *Bagrus* was therefore worked out for a number of localities around the lake and ontogenetic changes established. In general, it was found that *Bagrus* were feeding principally on fish, mainly *Haplochromis*, at standard lengths greater than 20-30 cms. There was low positive correlation

between predator/prey size relationships in any one area fished by day or by day and night, and considerable variation in prey size between areas for any given predator length. Negative correlation coefficients were found when only data collected by night were analysed, indicating either that the manner of feedig differs by night from feeding by day or that migration of the prey away from the *Bagrus* caught on the bottom occurred. The invertebrate components of the diet varied with the degree of exposure of the area fished. The major feeding period in all areas was found to be in the early morning.

(3) PRELIMINARY TAGGING EXPERIMENTS

Since it is hoped to institute a tagging programme soon, tank experiments utilising new equipment and new types of tags, were carried out mainly on *Tilapia* hybrids. The tags consist of monofilament nylon streamers with a T-piece at one end for anchoring in the fish following insertion through a hollow needle. The tags are produced in clips of fifty held in a gun carrying the needle. That part of the tag bearing the legend consists of a vinyl tube surrounding the monofilament at the opposite and from the T-piece.

Preliminary results indicated that tagging in the caudal peduncle gave better tag retention than tagging in the shoulder and a later experiment confirmed this. After six months six *Tilapia* showed 100 per cent retention in the peduncle whereas two of these tagged in the shoulder shed their tags and one died. A further factor to be considered was the effect of the tag on the fish and it is of interest that the fish tagged in the peduncle did not demonstrate as great an initial weight loss as the control fish following handling, whereas those tagged in the shoulder lost more weight than the controls. The overall effect of tagging was to slow the rate of weight increase following the initial decline although this was more marked in the shoulder tagged fish. Therefore, it would appear that fish tagged in the caudal peduncle retain their tags at least for six months and more closely correspond to untagged fish. Results for other species were inconclusive but live tagged *Tilapia, Bagrus* and *Labeo* were displayed at the Busoga District Annual Show to familiarise the local population with the appearance of the tags.

(4) LABEO AND OTHER ANADROMOUS FISHES

To augment the limited supply of *Labeo*, length frequency data derived from the experimental gill netting carried out in Napoleon Gulf since 1966, the standard length and sex of all *Labeo* (ningu) landed at Masese fish market from gill-nets of known mesh size have been recorded since January. From the combination of both sets of data it has been possible to estimate the mean retention lengths of gill-nets for the range of mesh sizes from 1½" to 2½" stretched mesh. A provisional growth curve estimated from raw data for *Labeo* will require some adjustment and it should then be possible to assess the mean age of the *Labeo* caught commercially. Commercial landing returns continued to be supplied by the Tanzanian Fisheries Department but catch rates have continued at the same steady low level as for the previous eight years. In view of this continued low level catch it is suggested that the best method of increasing the *Labeo* stock, and therefore the catch rate, would be to eliminate or reduce the fishing pressure against the species, particularly at the mouths of the affluent rivers during the rainy seasons,

for a minimum of five years and allow its great fecundity to bring about natural stock regeneration. This could be achieved by enforcing legislation restricting the gill-nets used to mesh sizes of greater than 3 inch stretched mesh.

Further counts of all ripe eggs present in the ovaries of mature *Alestes jacksonii* fit closely to the regression of egg numbers on standard length computed from estimated egg numbers utilising the gravimetric proportional method. This indicates that the less laborious and much quicker proportional method yields adequate information to give good estimates of fecundity and will be used to estimate the fecundity of *Bagrus*, ripe ovaries from which have been collected from the catches made by the "IBIS". The method will continue to be used for *Schilbe*.

(5) NILE PERCH STUDIES

Collection of field data for *Lates* was continued in Lake Victoria and to some extent in Lake Kioga as well. Initially its feeding habits were followed in relations to its impact on the important *Tilapia* stocks. Simultaneously, information on its breeding biology was being collected and detailed analysis of data is currently being undertaken.

So far the feeding habits of *Lates* in two lakes seem to show changes in the species of prey taken. In Lake Victoria, the *Haplochromis* predominate in the stomachs whilst *Tilapia* and *Clarias* are only occasionally ingested. In Lake Kioga, however, *Engraulicypris*, Odonata nymphs and Crustacea form the chief food of *Lates*. Earlier observations during early 1960s had indicated that in Lake Kioga, Cichlids, Mormyrids and *Engraulicypris* were the most important food. In this lake too, *Lates* preys extensively on its own juveniles.

(6) STOCK ASSESSMENT AND TRAWLING SURVEYS

The "IBIS" has been bottom trawling for the greater part of the year. A total of 551 hauls were made over the year either as short exploratory one-day trips or cruises lasting for at least several days. Of these, 275 hauls were made in Uganda section of Lake Victoria. The respective figures for hauls made in the Tanzania and Kenya portions of the lake were 217 and 59.

The general botom trawl survey of the diverse habitats of Lake Victoria was almost completed during the year. The areas of the Lake not yet covered are: Uganda/Tanzania border to Bugoma channel, Mwanza to Emin Pasha Gulf and part of the offshore waters more than 50 metres deep. These are scheduled to be surveyed by the end of February, 1970. Though several areas have been trawled more than once, Ingira and Hannington Bays were sampled almost monthly to detect any seasonal distribution and movements of the fish fauna in these areas.

Throughout the general survey work the following investigations have also been emphasized:

(i) Comparison of catch characteristics for different gear and different codends.

(ii) Determination of fish distribution by depth and lake area.

(iii) To carry out 24-hour trawl surveys to assess diurnal changes in catch rates in different habitats.

(iv) To conduct light attraction experiments to determine suitable mesh size for a purse seine which would provide some of the ecological parameters for *Engraulicypris* and better reflect the fishery potential of the lake.

(v) To get sufficient quantities of the commercially important species *(Tilapia, Bagrus, Clarias, Protopterus* and *Haplochromis),* for the test marketing studies either as fresh ("iced") or sometimes dried *(Haplochromis).*

(vi) To collect biological data necessary for the interpretation of population structure and assessment of fish stock. This, however, is currently hampered by the absence of a suitable method for age determination of these tropical fishes.

(7) LAKE VICTORIA TILAPIA FISHERY

Initially this work aimed at describing the current status of the *Tilapia* fishing industry in Lake Victoria. A regular monthly census of catches and fishing effort was undertaken in two selected fishing camps in the north eastern part of the lake. Investigations of the operations of the camp was expanded to cover other camps. A considerable quantity of data has been collected and is currently being written up.

(8) LAKE BARINGO

A survey of the fisheries of Lake Baringo was conducted in May-June. Detailed analysis of the commercial catch records provided by the Kenya Fisheries Department from 1966 to 1969 was made. *Tilapia* is the most important genus in the commercial gill-nets; *Barbus* and *Clarias* comprise only a small proportion of the catch; whilst *Labeo* although present in numbers is too small to be taken in the 4-inch nets. Since the end of 1966 there appear to have been radical changes in the catch per net. *Tilapia* showed a massive increase up to February 1967, remained fairly constant until February 1968, and then the figure dropped progressively to February 1969, since then it has apparently started to recover again. The monthly variation in catch of *Barbus* follow very closely the changes in the catch of *Clarias* which has also remained generally constant over the entire period. Catches of *Tilapia* which are high in July-September appear to show a seasonal decline in January-March but conversely *Barbus* and *Clarias* show the opposite trend. In March 1969 there was a remarkable sudden simultaneous peak in catches of both *Bagrus* and *Clarias* over a period of five days, possibly related to rainfall pattern and the stimulation of reproductive behaviour. There are considerable variations in the catch per net of all three species, both between individual fishermen on the same day, and between different days by the same fishermen, possibly indicating for *Tilapia* at least, considerable shoaling behaviour.

(9) LIMNOLOGICAL STUDIES OF LAKE VICTORIA

Routine sampling of the permanent inshore and offshore hydrological stations and random water quality measurements (temperature, dissolved oxygen, pH conductivity) were made in various northern bays to test for similarities and differences in the stratification cycles of these closely connected bays. The weekly Grant Bay/Buvuma Channel transact study, started in September, 1968 to follow more critically the hydrological developments from the nearly completely enclosed Grant Bay to the open Buvuma-Rosebery Channel just opposite, was continued; and as had been observed from the inshore/offshore measurements, this study confirmed that stratification, with its consequent deoxygenation of the bottom waters, was well advanced by September in the enclosed shallow bays and protected deep passages, whereas in the open deeper waters, this process became well marked only much later in the second half of October and November. Nevertheless, unlike in the deep waters and protected passages where stratification persisted up to June, in the shallow bays stratification was encountered only in the absence of local wind disturbances.

The northern inshore stations have been sampled about twice and the offshore ones once a month. The first transect was run across the middle of the lake in February, the second across the middle of the western half of the lake in March, the third (farther west) in April, and the fourth off and parallel the eastern shore in May. Measurements taken on these transect included temperature, dissolved oxygen and conductivity, vertical profiles, and vertical zooplankton hauls and euphotic zone chlorophyl 'a'.

In general, the results of these transects indicated that the hydrological changes in the entire lake may not be reflected by measurements taken at any one point in the lake. Secondly, with regard to the bottom distribution of the different types of fish, it is now apparent that even when dissolved oxygen and food are not limiting, there is a depth limit for every genus or species beyond which its catches become insignificant. The most obvious proximate factors that are functions of depth are hydraulic pressure and light intensity. But since below a certain depth — about 10 and 35 metres in inshore and offshore waters respectively — the light intensity is almost nil, pressure is likely to be the most important factor determining this limit, the intensity of light being only important, among other things, for the diurnal vertical migration of the fish within the light zone of the water.

(10) FISHERIES ECONOMICS (COSTS) STATISTICAL DATA COLLECTION

Tanzania

During the year the "weighing system" was introduced and established in Tanzania at the following beaches: Mwanza, Kalemera, Musoma, Nyakaliro, Nansio and Ukerewe Island and Bukoba.

This is the system that was established in 1968 at various landings on the Kenyan shore of Lake Victoria. It is considered that this method is an improvement on the sampling system in use in Tanzania.

Uganda

During April and May a survey of beach landings was made along the Ugandan shore of the lake in order to find suitable sites for statistical recording stations as Uganda Fisheries Department was keen that a comparison of its method and the "weighing system" be made. Due to the scattered nature of the landings it has been difficult to find suitable locations. However,, the port of Majanji has been selected for a trial and data is being recorded by a Fisheries Assistant from Uganda Fisheries Department whilst efforts were made to locate other suitable landings.

COST STUDIES

(a) In response to Uganda Fisheries Department's request, studies were made of various types of fishing craft operating on Lake Albert in order to compare their profitability. Frequent set-backs were encountered due to the inaccuracy of data being received. Frequent check-ups to the lake were made in order to supervise and assist the Fisheries Assistants who were collecting the information.

Lake Victoria

(b) Little is known of the costs and earnings of fishermen on Lake Victoria and studies were commenced of several selected fishermen operating from Lingira Island, which is some twelve miles from Jinja, to gain knowledge of general incomes and expenses.

MARKET SURVEYS AND TEST MARKETING

In order to study the impact of the envisaged increase of fish production due to the possible introduction of trawler fishing on Lake Victoria, extensive market surveys and test marketing experiments were carried out in different parts of East Africa. Market experiments were carried out in Shinyanga and Maswa districts of Tanzania and in Kampala, Entebbe and around Jinja in Uganda. Similar experiments were undertaken in Kenya. More surveys and market experiments will have to be carried out again before any final conclusions can be reached regarding the marketing of the possible increase in production and the profitability or otherwise of trawler operation.

MARKETING OF SUN-DRIED AND SMOKED HAPLOCHROMIS

Marketing experiments with smoked and sun-dried *Haplochromis* were made in Jinja and Kisumu to study the feasibility of economic exploitation of this genus which constitutes the highest percentage by catch of Lake Victoria fishes, but meets very low demand when marketed in a fresh state. Smoked *Haplochromis* met an encouraging response from Jinja's fish consumers whilst high hopes are held for this product in Kisumu for retail markets in Nyanza areas. Many more experiments will be carried out in the coming year with both smoked and sun-dried *Haplochromis*.

VISITORS

Tremendous interest was shown by many visitors in the work being done in EAFFRO and the UNDP/FAO Project. Distinguished persons both

from within East Africa as well as other countries continued to show keen interest in the current research. On two important occasions EAFFRO and the Lake Victoria Project played host to two significant meetings during the year. The first of these involved a meeting of Project Managers and Co-Managers on the African Lake Projects including F.A.O. personnel in January. The second meeting, held on 19th June, was conducted by Professor D. P. S. Wasawo with members of the Working Party on Research Priorities and Administration. A visit to EAFFRO by the Secretary General, Mr. Z. H. K. Bigirwenkya, M.L.A. in January was greatly appreciated. Besides others, the following dignitaries paid brief visits to the Organization during the year.

Name	*Month*	*From*	*Interest*
Dr. R. Barrett	January	UNDP (W.H.O.)	hydrometeorology
Mrs. J. A. Smith	„	„	„
Mr. C. Lwanga	„	Kampala	„
Mr. H. A. Harbottle	„	„	„
Mr. L. S. Joeris	„	F.A.O., Lusaka	Lake Projects
Prof. K. Lagler	„	F.A.O., Rome	„
Mr. C. H. Clay	„	„	„
Mr. D. Kelley	„	„	„
Dr. L. E. Obeng	„	Ghana	„
Mr. K. Meecham	„	F.A.O., Malawi	„
Mr. P. Mzumara	„	Malawi	„
Dr. P. C. Raheja	„	F.A.O., Egypt	„
Dr. B. W. Taylor	„	F.A.O., Ghana	„
Mr. I. Coppelletti	„	UNDP, Kampala	„
Mr. C. M. Larsen	„	F.A.O., Rome	„
Mr. Z.H.K. Bigirwenkya	February	E.A. Community	Administration
Mr. P. H. Mbondo	„	„	„
Dr. B. A. Southgate	„	U.K.	Water analysis
Mr. P. Lucas	„	Kampala	„
Mr. R. Currie	„	Arusha	Administration
Mr. B. J. Andrew	„	Mbale	Refrigeration
Mr. M. A Okelo	March	Arusha	Administration
Mr. M. Wandera	„	„	„
Mr. L. Kosembo	April	Nairobi	Audit
Mr. E. B. Byahuka	„	„	„
Mr. J. N. Manywa	„	„	„
Mr. F. X. Oliso Emosingoit	„	Arusha	Public Service
Prof. D. Wasawo	June	E.A. Community	Working Party
Dr. H. Y. Kayumbo	„	„	„
Dr. J. N. Itetia	„	„	„
Prof. W. B. Banage	„	„	„
Dr. J. G. Trenhitt	„	„	„
Dr. J. J. Njoroge	„	„	„
Dr. S. R. Jowi	„	„	„
Mr. A. K. Oteng	„	„	„
Mr. G. J. Kileo	„	„	„
Dr. A. Oppelt	July	Mulago	*Protopterus*
Dr. V. Zika	„	„	„

Mr. I. Dun	„	Lake George	Hydrobiology
Mr. H. Verdoun	„	„	„ „
Dr. E. Balon	August	F.A.O., Rome	„
Dr. J. M. Smith	„	London	„
Dr. T. Harvey	„	U.S.A.	„
Mr. B. E. Chambo	„	E.A. Community	Administration
Dr. H. L. Gotterman	„	Holland	Limnology
Dr. D. A. Livingston	„	U.S.A.	„
Mr. W. A. Smith, Jr.	„	Nairobi	A.I.D.
Mr. L. S. Cummings	„	Kampala	C.U.S.O.
Mr. Y. Miyake	„	F.A.O., Rome	Fishery Education
Dr. J. C. Srivastave	„	Nairobi	E.A. Academy
Mr. M. O. Abolarin	„	Nigeria	Fish Trypanosomes
Prof. W. B. Banage	September	Makerere	Hydrobiology
Mr. T. M. Msaky	„	E.A. Community	Administration
Dr. J. P. Thurston	„	Makerere	Parasites
Mr. R. Milburn	„	„	Aquatic plants
Prof. L. C. Beadle	„	Newcastle	Hydrobiology
Mr. A. W. Nangwale	October	Arusha	Buildings
Mr. W. Smith, Jr.	„	Kisumu	Fisheries
Mr. J. Siwo	„	„	„
Mr. A. S. Bassan	„	Nairobi	Accounts
Mr. F. Byabato	„	Arusha	Technical Aid
Mr. I. A. Kateta	„	„	Administration
Mr. E. Everard	„	Nairobi	Stores
Mr. M. Foby	„	London	Commonwealth
Mr. F. H. Sharpe	„	Kampala	British High Commission
H.E. Ahram Opi	November	Kampala	Israeli Embassy
Mr. Y. Biran	„	„	„
Mr. A. Killango	December	Dar es Salaam	Research & Training
Mr. B. E Ombuoro	„	Arusha	Administration
Mr. A. W. Nangwale	„	„	Buildings

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